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The principal trees of the temperate zone are the conifers *Chamaecyparis obtusa* and *C. formosensis*, with certain broadleaf trees often in mixture. Higher up *Pinus Armandi* appears in the sunny places, and large specimens of *Tsuga formosana* are found on the cliffs.

The vegetation of the frigid zone is very simple, with pure stands of *Abies Kawakamii* predominating. Higher up the mountains are grassy slopes with some low shrubs.

The author discusses the local occurrence of trees and shows that, despite the smallness of the island, there are many plants which have only a very local distribution. He also compares the ligneous flora of Formosa with that of Japan and the Philippine Islands. Gymnosperms are represented in Formosa by 14 genera, in Japan by 17, and in the Philippines by only 7. Pine trees are very common in Japan but occur only scatteringly in Formosa. In Japan the most valuable and widely distributed coniferous trees are "hinoki" (*Chamaecyparis obtusa*) and "sugi" (*Cryptomeria japonica*), while in Formosa "hinoki" and "benihi" (*Chamaecyparis formosensis*) are the predominant conifers. "Without 'hinoki,' in Formosa, the utilization of the forest would have been at a very great disadvantage."

As to the dicotyledonous trees, the Philippine flora has a strong representation of the higher orders, the Japanese of the lower; while the Formosan is intermediate. Dipterocarps, the predominant trees of tropical Asia and the most important commercially in the Philippines, have no representatives in Formosa. In striking contrast to the largely deciduous forests of Japan there is very little tropical deciduous high forest in Formosa. "This is due to the climate which has no prolonged dry season; and it is a rather interesting point that in the southern parts of Koshun, where the dry season comes in winter, there are [some] deciduous trees."

SAMUEL J. RECORD

THE RAINFALL MAP OF SOUTHERN AFRICA

J. R. SUTTON. **A Contribution to the Study of the Rainfall Map of South Africa.** Maps, bibliogr. *Trans. Royal Soc. of South Africa*, Vol. 9, 1921, Part 4, pp. 367–414. Cape Town.

The rainfall of South Africa has been studied and charted by several authorities, among them J. G. Gamble, Karl Dove, Raulin, Tripp, Buchan, and others. Buchan's maps are reproduced in Bartholomew's "Atlas of Meteorology," 1899. Recently J. R. Sutton, of Kimberley, who has contributed several valuable studies on various meteorological phenomena of South Africa, especially of Kimberley, has also given attention to the rainfall. Mr. Sutton's first paper, entitled "An Introduction to the Study of South African Rainfall" (published in *Trans. Phil. Soc. of South Africa*, May, 1904) dealt with 160 stations having records of long periods.

In his present contribution Mr. Sutton has used the monthly and annual rainfall values for 567 stations in South and East Africa. Hence he is able to give us a much more complete and accurate cartographic presentation, as well as descriptive and explanatory account, than has heretofore been possible. Most of the computation of the averages was done by the author himself. The aim has been to use all existing records of ten years or more. A good many cover over twenty years, and two (Rietfontein and Kimberley) cover 40 years. Records of less than 10 years have been used for areas not well supplied with gauges, "since it has seemed better to get an approximation to the average rainfall at such places than to ignore them altogether." In only one case has any interpolation been attempted. There is no statement of any reduction of the records to a uniform period. The stations are grouped in 30 sections, 17 of these being essentially those used by the late Meteorological Commission of Cape Colony. Descriptive and explanatory notes are given of each section. The area included extends as far north as to cover southern Angola on the west of the continent and the whole of Portuguese East Africa on the east.

There are thirteen maps (9 by 12 inches) showing the isohyetal lines for the twelve months and for the year, drawn on a base on which the main features of the relief are indicated. One feature of special interest stands out, and that is the few conspicuous instances in which there seems to be any marked influence of the mountains upon rainfall. Topographic effects are seen along the terraces facing the Atlantic, in a few other cases, and, most strikingly, in the Zoutpansbergen of northern Transvaal. The latter are the only obstacle to the unbroken course of the tropical dry belt across the continent. The explanation given by Mr. Sutton is that most South African rainfall comes in thunderstorms, "whose origins and tracks are largely independent of the geographical contours, and whose clouds are higher than most of the mountains." These conditions are obviously unlike those in regions where mountains are great breeding places for thunderstorms. The monthly maps show that the control of the rainfall is less dependent upon the topography than upon the seasonal migrations of the main rainfall belt to and from the equator. The winter rains of the southwest advance as the summer rains retreat, and vice versa. Similarly also the southern and southeastern coastal belt rains advance and retreat seasonally. Occasionally the winter rains of the southwest, and the southern coastal belt rains also, advance inland as far as Kimberley and Bloemfontein.

There are special brief discussions of the mean hourly variation of rainfall at Kenilworth (Kimberley); of the average number of rainy days; the greatest rainfall in one year; and the heaviest rainfall in 24 hours, for each section. A note on South African hailstorms brings out some interesting facts. Several cases of remarkably large hailstones are recorded. At Maritzburg in April, 1874, hailstones were "too big to go into a breakfast cup" (4½ by 3½ inches in diameter; weight 1½ pounds). In another hailstorm in December, 1915, one stone measured 4 by 4 by 4½ inches. Numerous hailstones fell which weighed over three-quarters of a pound. Many sheep were killed. One hailstone went through a roof of corrugated iron, leaving a hole about 3 inches in diameter. Two observers reported that the majority of the hailstones were the size of tennis balls.

A bibliography is appended which will prove useful in any general or historical study of the subject.

R. De C. Ward

Rural Life in New York State

E. O. Fippin. **Rural New York.** xv and 381 pp.; maps, diagrs., ills., index. (Rural State and Province Series, edit. by L. H. Bailey.) The Macmillan Co., New York, 1921. 7 x 5 inches.

Agriculture, the oldest of industries, is, in the minds of many of those who practice it and of more who depend upon it for the necessities of life, a little-understood vocation just to be taken for granted, like gravity. Both producers and consumers need enlightenment as to the factors on which agriculture depends.

The farmer needs an understanding, not merely of the practices and methods of his community, but of the whole agricultural region in which he lives. He needs further to appreciate the significance to him of industrial developments in other fields and how these change market demands. He must have an agricultural perspective on the country and perhaps the world; he must know when conservatism in agricultural practices is sane and when foolish. He must know agriculture as it is, however untenable this new knowledge may make the agricultural faith he may have inherited from the past.

The consumer, whether in home or factory, needs to appreciate that modern farming is a business and, like other lines of business, is subject to economic laws and principles. As a matter of useful information and for his own guidance he should know the reason of the distribution of agricultural areas, the reason for general farming in the northeastern states, why land apparently going to waste may mean agricultural efficiency, why farmers cannot change crops as readily as a machine shop can change patterns, what must be produced near to the consuming area, why the marketing of farm products is often costly, and many other matters that the up-to-date farmer has to understand and appraise in planning and carrying on his business.

Fippin's "Rural New York," the first of a series of volumes on the several states of the country, is a book for urban and rural people. The reader—and he can hardly fail to be an interested reader—will find that this little volume gives a real understanding of rural New York and throws much light upon rural life and conditions in the other northeastern states where mixed, or general, farming predominates.

The volume is well ordered, clearly written, and, barring many illustrative maps that are too minute for usefulness, eminently successful. It should be widely read, for it is a distinct contribution to our literature on rural life. No one can fail to gain from it a better appreciation of farming as it is and a keener sympathy for the farmer, who must often labor with only a partial understanding of the conditions that influence his success. No would-be back-to-the-lander, particularly in New York state, should fail to study this volume carefully before he "obeys that impulse."

Richard Elwood Dodge